CLAIMS

What is claimed is:

1. An apparatus for stimulating production from a hydrocarbon-containing formation in an oil or gas well, the apparatus comprising:

a container sized to be received and supported in the well at a level adjacent the formation;

at least one shaped charge supported within the container, the shaped charge adapted when ignited to perforate the formation;

a supply of oxygen-rich material supported within the container and adapted to be introduced explosively into the formation with the shaped charge whereby burning of hydrocarbons therein is promoted; and

at least one igniter for detonating the shaped charge.

2. The apparatus of claim 1 wherein the oxygen-rich material surrounds the at least one shaped charge in the container, wherein the container is elongated having first and second ends, wherein the apparatus further comprises two end charges of low order explosive material, one positioned at each of the first and second ends of the container.

3. The apparatus of claim 2 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charge and both the end charges and adapted to be ignited by the igniter.

4. The apparatus of claim 3 wherein the igniter is an electric igniter.

5. The apparatus of claim 2 wherein the at least one shaped charge comprises a plurality of shaped charges positioned to perforate different locations in the formation.

6. The apparatus of claim 5 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charge and both the end charges and adapted to be ignited by the igniter.

7. The apparatus of claim 1 wherein the oxygen-rich material is potassium nitrate.

8. The apparatus of claim 1 wherein the at least one shaped charge comprises a plurality of shaped charges positioned to perforate different locations in the formation.

9. The apparatus of claim 8 wherein the apparatus further comprises a high order primer cord in contact with each of the at least one shaped charge and both the end charges and adapted to be ignited by the igniter.

10. The apparatus of claim 1 wherein the igniter is an electric igniter.

11. The apparatus of claim 8 wherein the apparatus further comprises a primer cord in contact with each of the at least one shaped charge.

12. The apparatus of claim 1 wherein the oxygen-rich material is part of each of the at least one shaped charge and adapted to be propelled into the formation by the explosion of the shaped charge.

13. The apparatus of claim 12 wherein the oxygen-rich material is potassium nitrate.

14. The apparatus of claim 12 wherein each of the at least one shaped charge comprises:

a body of explosive formed to have a conical frontal recess;

a detonator adapted to ignite the body of explosive;

a liner shaped to line the frontal recess in the body of explosive; and

wherein the oxygen-rich material forms a layer between the liner and the frontal recess of the body of explosive.

15. The apparatus of claim 12 wherein each of the at least one shaped charge comprises:

a body of fast burning explosive formed to have a conical frontal recess;

a detonator adapted to ignite the body of fast burning explosive;

an insert shaped to conform to and be received in the frontal recess in the body of explosive and to have a planar front, the insert formed of a slow burning explosive; and

a disc-shaped layer of fast burning explosive having a front and a rear, the rear positioned on the planar front of the insert;

wherein the oxygen-rich material forms a layer on the front of the layer of fast burning explosive.

16. The apparatus of claim 12 wherein each of the at least one shaped charge comprises:

a first body of fast burning explosive formed to have a frontal recess;

a body of oxygen-rich material formed to be received in frontal recess of the first body of explosive and to have a frontal recess with a cylindrical center and a frusto-conical forward portion;

a second body of fast burning explosive shaped to conform to and be received in the cylindrical center of the recess in the body of oxygen-rich material and to have a conical front recess continuous with the frusto-conical forward portion of the frontal recess in the body of oxygen-rich material so that the frontal recess of the second body of explosive and the frusto-conical portion of the frontal recess in the oxygen-rich material form a complete cone;

detonators adapted to ignite the first body of fast burning explosive and the second body of fast burning explosive; and

a conically shaped metal liner positioned inside the complete cone formed by the frontal recess of the second body of explosive and the frusto-conical portion of the frontal recess in the oxygen-rich material.

17. The apparatus of claim 12 wherein each of the at least one shaped charge comprises:

a body of fast burning explosive formed to have a stepped frontal recess with a conical center portion and a frusto-conical forward portion

having a narrowest diameter to form a step between the center portion and the forward portion;

a body of oxygen-rich material formed to be received in frusto-conical forward portion of the frontal recess of the body of explosive and having a narrowest diameter substantially the same as the widest diameter of the center portion of the frontal recess of the body of fast burning explosive, so that the conical center portion of the frontal recess of the body of explosive and the body of oxygen-rich material form a complete cone;

a detonator adapted to ignite the body of fast burning explosive; and

a conically shaped liner positioned inside the conical center portion of the frontal recess in the body of fast burning explosive.

18. A method for stimulating hydrocarbon containing strata in an oil or gas well, the method comprising:

perforating the formation using a shaped charge; and

explosively introducing an oxygen-rich material to the formation whereby burning of the hydrocarbons is promoted.

19. The method of claim 18 wherein the oxygen-rich material is potassium nitrate.

20. The method of claim 19 wherein the oxygen-rich material is introduced into the formation ahead of the jet from the shaped charge.

21. The method of claim 19 wherein the oxygen-rich material is introduced into the formation behind the jet from the shaped charge.

22. The method of claim 19 wherein the oxygen-rich material is introduced into the formation by the explosive force of the shaped charge.

23 The method of claim 18 wherein the oxygen-rich material is introduced into the formation by the explosive force of the shaped charge.

24. The method of claim 18 wherein the oxygen-rich material is introduced into the formation behind the jet from the shaped charge.

25. The method of claim 18 wherein the oxygen-rich material is introduced into the formation ahead of the jet from the shaped charge.